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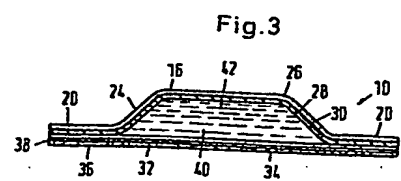
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⑥④ Article for the dispersion of a volatile substance and an article of manufacture comprising a plurality of said articles.

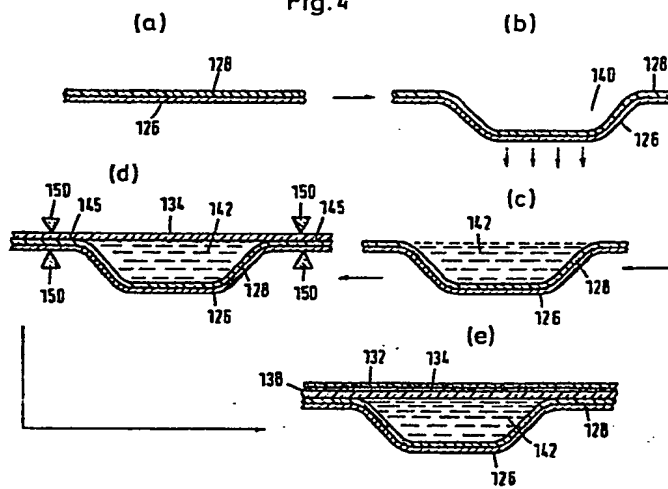
⑥⑦ In an article for the dispersion of a volatile substance to the surrounding atmosphere opposed outer and inner wall members (24, 32) are joined along their peripheral portions (12, 14, 20, 22) to define a centrally disposed reservoir portion (40). This reservoir portion contains the volatile substance (42). The outer wall comprises a liquid impervious gas permeable polymer (28). The first barrier layer (26) is removably attached to and covers the outer surface of this gas permeable polymer. The inner wall (32) comprises a second barrier layer (34) impervious to gases and liquids. The bond between the outer wall or gas permeable polymer (28) and the first barrier layer (26) is adapted to be weakened by the volatilizable substance dispersing through the outer wall. Thereby the ready removal of the first barrier layer from the outer wall is reached prior to use of the article.



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Fig. 4



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- 10 Article for the dispersion of a volatile substance and an article of manufacture comprising a plurality of said articles

15 The invention relates generally to an article of manufacture for the slow release of a volatilized substance such as deodorizing means, insecticides, repellants, perfumes, medicaments and the like.

20 A prior art article for the dispersion of a volatile substance to the surrounding atmosphere has two laminated panels each comprising a plurality of layers (US-A-4 145 001). A first panel encompasses a substantially liquid impervious, gas permeable polymeric inner layer. Adjacent this layer of thermoplastic material are arranged a release layer, a vapor impermeable outer layer and a protective layer. The release layer and the vapor impermeable outer layer are bonded by a laminant. A second laminant is provided between the outer layer and the protective layer. The protective layer can be formed of Mylar polyester. The second panel which is designed impervious to molecular diffusion comprises a second inner layer which may be formed of the same material as the gas permeable layer but it is not necessary that the second inner layer be permeable to the vapors of the volatile material. The second panel further encompasses an outer layer of aluminium, a protective layer and a laminant between the outer layer and the protective layer. - A volatilizable substance is

5 contained in an absorbant pad which is arranged between  
both panels. The permeable inner layer is initially bonded  
to the release layer which consists of a material not  
forming strong heat bonds with the permeable layer. However  
the strength of the heat bonds remains essentially constant  
10 independent of the time after finishing the heat bonds.  
Therefore a compromise has to be chosen for providing a  
heat bond strong enough which is not impaired by the  
manufacturing process and by the handling immediately  
following the manufacturing process but which is never-  
15 theless weak enough for easy release prior to use of the  
article for the dispersion of the volatile substance.  
Further, the panels constituting this complex layer system  
are expensive to manufacture.

20 It is therefore an object of the invention to improve the  
connection between the barrier layer (or release layer)  
which has to be released from the gas permeable layer prior  
to activating the article. The release shall be effected  
easily although a reliable connection shall be achieved  
25 for lasting the time in which the article suffers the  
strongest impact in the course of manufacturing and  
immediately following thereto. It is another object of the  
invention to provide an article with an uncomplicated  
design of the layers. More generally it is an object of  
30 the invention to provide such an article embodying  
structural features enabling efficient utilization of  
volatile substance and only at time of desired use.

Yet a still further object of the invention is to provide  
35 such an article having an arrangement of parts conducive  
to efficient mass production and relatively inexpensive  
manufacture.

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5 The invention is described but not limited by reference to the accompanying drawing wherein:

FIG. 1 is a top plan view shown partly broken away illustrating one embodiment of the invention;  
10 FIG. 2 is a side elevational view of the embodiment of FIG. 1;  
FIG. 3 is an end sectional view taken along line 3-3 in FIG. 2;  
FIG. 4 is a process diagram depicting the step-wise  
15 method of forming the article of the invention;  
FIG. 5 is a plan view with partly broken away section illustrating another embodiment of the invention;  
FIG. 6 is a side elevational view of the folded side;  
FIG. 7 is an enlarged sectional view taken along line  
20 7-7 of FIG. 6; and FIG. 7A is an alternate embodiment;  
FIG. 8 (a)-(e) is a schematic illustration of the process for making the latter embodiment of FIGS. 5 - 7 and 10;  
25 FIG. 9 is a side view taken along line 9-9 of FIG. 8;  
FIG. 10 is a sectional perspective view of the embodiment of FIGS. 5 - 7 and  
FIG. 11 and 11A show another embodiment of the invention.  
30 In the latter embodiment shown in FIGS. 5 - 10, it is a further object of the present invention to provide a slow vapor release article wherein single gas permeable polymeric material is employed in forming the reservoir and yet the aforesaid embodiments are achieved.

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- 5 It is still a further object of this invention to provide an article as immediately aforesaid in which a solid pad provides the volatilizable liquid source, solid block, pellets or gels.
- 10 In the following description like reference numerals designate similar parts throughout the several views and wherein 10 generally designates an article in accordance with the invention, the embodiment of FIG. 1 depicting an elongated strip material having opposed longitudinal
- 15 edges 12 and 14 provided with pouch or envelope portions 16 and 18 surrounded by sealed rim portions 20 and 22, respectively. The construction is illustrated in more detail in FIG. 3. Outer wall member 24 comprises a first barrier layer 26 which completely overlies polymeric
- 20 diffusion layer 28 being removably adhered thereto. Vapor barrier layer 26 may be of a variety of materials but is most preferably thin metal foil such as aluminium foil. It is essential in the present invention that vapor barrier layer 26 be impermeable to the passage of gas or vapor as
- 25 will be described in detail hereinafter.

Materials other than metal foil such as a wide variety of plastic materials, may be effectively used provided such material have the defined vapor impermeability character-

30 istics and particularly within the temperature-humidity ranges encountered in the intended use. For example, as regards deodorizing applications in accordance with the invention, moderate temperatures normally characteristic of household applications would be encountered; however,

35 in accordance with other embodiments of the invention e.g., the use of the article as a deodorizer, sanitizer, etc. to be added to the drying cycle of a clothes

5   laundrying operation, the temperatures would be quite  
higher. Thus, the chemical nature of barrier layer 26  
depends on the ultimate utility contemplated, and  
selection of this material has necessary reference thereto.

10   Polymeric materials useful in the preparing diffusion  
layer 28 may be selected from a relatively wide range of  
substances, e.g., polymers and interpolymers derived the  
polymerization of one or more ethylenically unsaturated  
monomeric materials, i.e., the vinyl monomers. The poly-  
15   meric materials are essentially water insoluble i.e.,  
hydrophobic. In addition, such materials, in accordance  
with an essential aspect of the invention, while being of  
a impervious nature will nevertheless allow diffusion  
of the gas or vapor produced form the volatilization of  
20   the volatiled material confined within the reservoir 16.  
A particularly preferred polymer of the vinyl type is  
polyvinyl chloride although polyethylene, polypropylene  
and the like, may be used. Polymers other than those of  
the vinyl type may be used with advantage, these  
25   including, without necessary limitation, polyurethanes,  
polysiloxanes (silicones), thermoplastic elastomers,  
rubbers, etc. such as the product available commercially  
under the trade name designation HYTREL. Preferably the  
gas permeable polymeric layer is a polyethylene  
30   terephthalate marketed under the trademark MYLAR. As was  
the case with reference to barrier layer 26, selection of  
a given polymer within the limitations expressed is  
controlled at least in part by the conditions to be  
encountered in the ultimate use contemplated. The molecular  
35   weight of the polymer material may be considered in the  
selection of the diffusion layer. The thickness of polymer  
layer 28 will generally range between about .01 and .001



5   inch. In the case of metal foil, layer bonding thereof to  
polymer layer 28 may be achieved with adhesive; adhesive  
is also optional with the use of plastics as the barrier  
layer 26, the requisite bonding being obtainable, for  
example, by heat seal or heat fusion.

10

It is to be borne in mind that while the metal foil  
prevents vapor release to the atmosphere, some volatile  
fraction permeates the polymer diffusion layer and  
collects between the foil-polymer interface thereby  
15   separating and permitting more ready release of the foil  
from the polymer up to the heat-sealed perimeter of the  
reservoir.

For manufacturing convenience inner wall member 32 may be  
20   same as outer wall member 24 previously described.  
Alternatively, the inner wall may comprise only a single  
layer 34 which may be constructed of the same or different  
material as barrier layer 26. Again the essential  
properties of such barrier layer is both liquid and gas  
25   permeable, in addition must be sealable to outer wall  
thereby completing formation of the sealed reservoir.

Barrier layer may be coated with an adhesive, preferably  
pressure sensitive, and an outer release paper. Alter-  
30   natively, a section of double faced adhesive film and  
release paper may be applied, or tipped on during the  
reservoir forming, filling or sealing machine cycle.

Polymer diffusion layer 28 and barrier layer 34 are  
35   bonded to form a permanent union. This union is most  
effectively accomplished by heat-sealing or heat-fusion  
according to known techniques to form reservoir or supply

- 8 -

- 5 portion 40 enclosed by rim portion 20. Reservoir portion 40 is adapted to contain and confine a volatile substance 42 which may be in liquid form, e.g. solution, gel emulsion, suspension, etc., or alternatively may comprise a solid shape pellets, or semi-solid material (not shown)
- 10 such as wax, padding material and the like saturated or super-saturated with the volatile substance. Gel forms include blends of the liquid active volatile agents with gelling agents such as cab-o-sil, carinogen, carboxymethyl cellulose, and the like. Polymer layer 28 can be set to the
- 15 partly arcuate shape illustrated in FIG. 3, e.g., by molding, or alternatively, can be a resiliently flexible member which assumes the shape illustrated upon introduction of the volatile substance.
- 20 Suitable volatile substances useful in the construction herein described include perfumes, deodorizers, fragrances, anti-bacterial agents, anti-microbial agents, counter-actants, insecticides, insect-repellants, corrosion-inhibitors, attractants, medicants and the like. Suitable
- 25 perfumes include without necessary limitation the essential oils of various fragrances, flower perfumes, e.g., lilacs, roses, etc., wood perfumes such as cedar, pine, briar, etc., fruit flavorings such as lemon, cherry, etc..
- 30 Medicinal volatiles include menthol, camphor, eucalyptus and the like; exemplary anti-bacterial agents include phenol, thymol, and the like.

In use, the consumer merely removes barrier layer 26 to

35 "activate" the vapor dispensing article. For such purposes, a tab member 17 may be provided on layer 26. Removal of layer 26 allows the vapor from volatile

5 substance 42 to escape into the surrounding atmosphere through permeable polymeric layer 28. The vapors are dispensed at a substantially linear rate and penetrate the entire extent of the reservoir surface area of layer 28. Premature or inadvertent dispensing of the vapors is  
10 effectively prevented by virtue of barrier layer 26. Thus, until the time of actual use, barrier layer 26 remains in place which time removal is effected by the consumer. If desired, layer 26 can be repositioned on the polymer layer and the vapor diffusions discontinued until a later time.

15 In a further aspect of the invention, release layer 36 can also be stripped from the article as desired by the consumer to expose adhesive layer 38. This adhesive backing enables the article to be attached to a variety  
20 of environmental surfaces such as walls, closets, bathroom surfaces, etc.. Moreover, being of flexible, lightweight construction, it can readily be affixed to surfaces of arcuate configuration such as piping. This adaptability feature enables the article to be positioned in areas  
25 which would not ordinarily be readily visible and is thus of significant advantage from an esthetic standpoint. The use of perfume-containing articles is of particular value where it is desired to mask or neutralize objectionable scents such as those encountered  
30 in kitchens, bathrooms, closets and the like. The article may also be used to dispense vapors having therapeutic effects when inhaled and can accordingly be affixed to any suitable surface in the room where necessary.

35 Handling of the present article is expedited by the presence of rim portion 20 (FIG. 3). Thus in use, the consumer need not directly contact pouch portion 16 and

5 thus indirectly, the contents of reservoir portion 40.  
This is important since it virtually eliminates inad-  
vertent rupturing of the pouch portions which might  
otherwise occur due to the compression force exerted in  
handling. As will be further noted, escape of the  
10 volatilized material is limited directionally, outwardly  
of the element through gas-permeable polymeric layer 28.  
Barrier layer 34 prohibits escape of such vapors rear-  
wardly of the element. It is important that barrier  
layer 26 completely cover the outer reservoir surface of  
15 polymeric layer 28 so as to provide a seal. In this  
manner, premature escape of vapor is prevented.

As illustrated in FIG. 1, the article of the present  
invention may be provided in the form of an elongated  
20 strip comprising a plurality of such articles. Perforat-  
ions 44 provided laterally of the connecting rim portions  
enable individual elements to be severed as desired.  
Alternatively, several connected elements can be used to  
provide an even greater supply of vapor to the surrounding  
25 atmosphere.

As previously mentioned, the volatile material may be in  
the form of a liquid, e.g., solution, suspension or  
emulsion, or in the form of a semi-solid or solid  
30 material impregnated with the volatile material. Thus,  
the emulsion form can be achieved with the use of a  
suitable solvent along with a surfactant material and/or  
a protective colloid such as polyvinyl alcohol, methyl  
cellulose and the like. Particularly effective surfactants  
35 include nonionic detergents derived from the polyoxy-  
alkylation of alcohols. Impregnated waxes and fibrous  
materials may also be used. In any event, regardless of

5 the type of carrier used, the volatile substance should readily produce vapor for passage through polymeric diffusion layer 28.

One of the particularly valuable aspects of the invention relates to the fact that a relatively large  
10 volume, and high concentration of aromatic perfume, for example is accommodated by the article reservoir relative to its total size, e.g. 3 - 4 grams of perfume concentrate per article. In addition, an almost linear  
15 release of the perfume is achieved due to the constant concentration gradient of volatilizable material maintained within reservoir portion 40. This allows substantially uniform dispensing of the perfume ingredient over a prolonged period of use. This is to be contrasted  
20 with prior art devices and particularly those requiring adjustment of the part of the user as a given increment of available surface area sublimates and becomes depleted. Furthermore, the present articles are relatively inexpensive due to the simplicity of their construction,  
25 ease of continuous manufacture and the low cost types of polymeric material required.

In the present invention, the hermetically sealed envelope type construction renders the article highly efficient  
30 as regards the use of highly concentrated reservoir supply.

Referring now to FIG. 4. there is shown a step-wise method of forming the article of the present invention. In step a., a continuous strip of the diffusion polymer  
35 128 bonded to the metal foil 126 is provided with the metal foil disposed below the polymer, and in step b., a pouch or reservoir 140 is formed in the strip by well-

5 known pressure-forming or vacuum forming means (not shown). In step c., the volatile substance (e.g. liquid) 142 is placed in formed reservoir 140. Thereafter a strip of polymer barrier layer 134 is placed over the reservoir portion as well as over the face portions 145  
10 of polymer diffusion layer 128, and a well-known heat-seal crimp mechanism 150 provides a peripheral heat-seal of polymer layers 134 and 128, and a crimp-seal of layer 128 to foil 126. Turning to step c., the article of step d., is further provided with a pressure sensitive  
15 adhesive covered by release paper 132.

The present articles may be simply manufactured. As stated, bonding of polymeric layer 128 and barrier layer 34 can be effected by simple heat sealing or fusion. Volatile  
20 liquid substance can thereafter be introduced into reservoir portion 40 by needle injection. In the case of solid and semi-solid volatiles, fusion of layers 28 and 34 may be effected across the mass of volatile material. Other techniques relevant to preparation of  
25 the present articles are described for example in U.S. patents 2 940 230; 2 793 481; 2 290 564; 3 020 687; 2 958 169; 2 998 176; 2 469 975; 2 802 324; 3 065 915 and 636 317.

30 Referring to FIGS: 5- 10 there is shown another embodiment of the invention generally referred to by numeral 50. Article 50 comprises a liquid impermeable gas permeable polymeric sheet 51 which is folded on itself as at 50 and heat sealed at four portions, 52a, 51, 52 and 53 so as to  
35 form a liquid reservoir 54. A saturated fabric or paper pad 55 is disposed within the reservoir 54. An aluminium foil 57 has previously been adhesively bonded to the outer surface 58 of the polymer as at 59 and extends

5 around the polymer. The volatilizable material, diffuses through the polymer 51 and renders the foil barrier layer more readily peeled and removed from the polymer layer to activate the article.

10 The article 50 is preferably formed as a strip 60 which contains a plurality of said articles 50. The strip contains a plurality of scores of perforations 61 which permit detachment of the individual articles 50 from each other. Each article also contains a partial oblique  
15 score 63, to provide a tab 62 for readily lifting the foil 57 in peeling same.

It is to be understood that the foil need only be peeled to the extent one would want to expose the polymer  
20 surface.

The more surface area exposed the more volatile material disperses to the atmosphere for the same time period.

25 Referring to FIG. 8, there is shown in FIGS. 8(a) to 8(d) a process schematic for forming the embodiment of FIGS. 5 - 7; and FIG. 8(e) refers to a further embodiment. In FIG. 8(a) there is shown the strip 60 in cross-section (end view) with aluminium foil 57 adhesively bonded thereto.  
30 Pad 55 is disposed on the polymer about one-quarter of the distance transversely across the polymer surface.

The polymer-foil sheet is then folded over to cover the pad as shown in FIG. 8(b). In-line heat-seal and perforat-  
35 ing and scoring elements 90 and 100 respectively are well known in the art, and are applied as shown in FIGS. 8(c) - (c<sub>1</sub>) and 8(d) respectively, so as to form sealed

5 perforated portions 51, 52, 53 and 54 and scored portions 61 and 63. It is to be noted that transverse score 61 passes through the entire profile while oblique or tab score 63 does not, as best shown in FIG. 10. The partial (to 62a) score 63 permits ready peel-away of the  
10 barrier layers. The scores 61 and 63 are formed by score elements 99 and 99a, respectively (FIGS. 9 and 13). A score-receiver platen 101 is provided to facilitate scoring.

15 In further operation A, the article 50 may be further processed as shown in FIG. 8(d). Specifically, there is shown a double adhesive tape 76 comprising strip 77 with adhesives 78 and 79 on opposing surfaces, a peelable paper strip 80 covering adhesive 79 which tape may be  
20 adhesively or thermoadhesively bonded to the under surface 57. In this manner of construction the paper 80 may be peeled and the article 50 then applied to any desired surface.

25 Specifically in forming the sealed article, a die 90 is provided which has vertically reciprocating top member 91 in relation to the feed strip, and a stationary bottom platen 92 or more specifically member 91 is formed with a recess 93 to accommodate the shape of the article.

30 Member 91 is also formed with rectilinear peripheral electrical heat sealing elements (e.g. 95, 96) which are oppositely disposed to platen elements 97 and 98 so as to form the sealed portions 52a, 51, 52 and 53 in the article. As stated, in-line post-forming is made with  
35 perforation die cutter elements 99 and 99a of cutter 100 for forming perforations or scores 61 and the tab score 63 for tab 62; said scoring means being well-known in the art.



5 Referring to FIG. 7A, there is shown an alternate embodiment 150 wherein two separate polymeric and foil layers are heat sealed along four rectilinear lines, with seals 152a and 152 being shown. Thus, instead of a single polymer-foil sheet being folded over, two separate opposed  
10 polymer-foil strips (e.g. top polymer 159 and foil 157) are heat sealed to form reservoir 154 for pad 155 and its minimal liquid 156.

Referring to FIGS. 11 and 11A, there is shown another  
15 embodiment 250 which comprises separate polymeric and foil layers heat sealed along four rectangular lines with seals 252 and 252a being shown, as is similar to that of FIG. 7A. The heat sealed reservoir 254 is similar in construction to that of 154 of FIG. 7A embodiment.  
20 However, the reservoir in this other embodiment contains solid pellets 255 and 255a. Pellets 255 and 255a are formed of a polymeric matrix (e.g. ethylene, vinyl acetate, polyvinyl chloride, polypropylene and the like) which matrix contains a predetermined concentration of  
25 volatilizable active agent.

It is to be noted that while cylindrical pellets 255 and 255a are shown, any solid-shaped particulates may be employed, including rods, spheres, flakes, powders and  
30 the like. The volatilizable active agent may be mixed with a polymeric matrix material and formed by extrusion or casting and converted to the desired size and shape as is well-known in the art.

35 The rate of release of volatilizable active agent from the polymer matrix can be predetermined by selecting polymer matrix composition, varying the concentration of

5 active agent contained therein and varying the size  
(surface area) of the particulates.

It is also to be noted, pellets 255 and 255a are  
differently sized. Each pellet may contain a different  
10 active agent being released into the sealed reservoir  
at a predetermined rate. The combined vapors will move  
through the polymeric diffusion layer into the  
surrounding environment.

15 Great latitudes for achieving a programmed release of  
one or more volatilizable agents can be achieved by  
premixing or blending particulates containing active  
agents, and inserting a predetermined amount of active  
matrix into the reservoir of the dispenser.

20 The present invention has been described with respect  
to certain preferred embodiments thereof. However, it  
will be understood that changes and modifications may  
be made without departing from the scope thereof.

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5 Claims:

1. An article for the dispersion of a volatile substance to the surrounding atmosphere, said article comprising opposed outer (24) and inner (32) wall members joined  
10 along their peripheral portions (12, 14, 20, 22) to define a substantially centrally disposed reservoir portion (40) for containing said volatile substance (42), said outer wall comprising said substantially liquid impervious, gas permeable polymer (28), and said  
15 first barrier layer (26), removable attached to and covering the outer surface thereof, said barrier layer being substantially impervious to gases and liquids, and said inner wall (32) comprising a second barrier layer (34) substantially impervious to gases and  
20 liquids, characterized in that the bond between said outer wall (gas permeable polymer 28) and said first barrier layer (26) is adapted to be weakened by the volatilizable substance dispersing through said outer wall, whereby ready removal of said first barrier layer  
25 from said outer wall permits dispersion of said volatile substance through said outer wall to the surrounding atmosphere.
2. An article according to claim 1, characterized in that  
30 an adhesive is disposed between said gas permeable polymeric layer (28) and said first barrier layer (26) which adhesive is attackable by said volatilizable substance.

35

5 3. An article for the dispersion of a volatile substance  
to the surrounding atmosphere, said article comprising  
opposed outer (126, 128) and inner (134) wall members  
heat-sealed along their peripheral positions to define  
a substantially centrally disposed reservoir portion  
10 (140) for containing said volatilizable substance (142),  
said outer wall comprising said molecular diffusion  
layer (128) and said first barrier layer (126) removably  
attached to and covering the outer surface thereof, said  
first barrier layer being substantially impervious to  
15 molecular diffusion, and said inner wall (134) comprising  
a second barrier layer substantially impervious to  
molecular diffusion, characterized in that said second  
barrier layer (134) comprises a dissimilar polymer  
from the polymer of said molecular diffusion layer (128).

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Fig.1

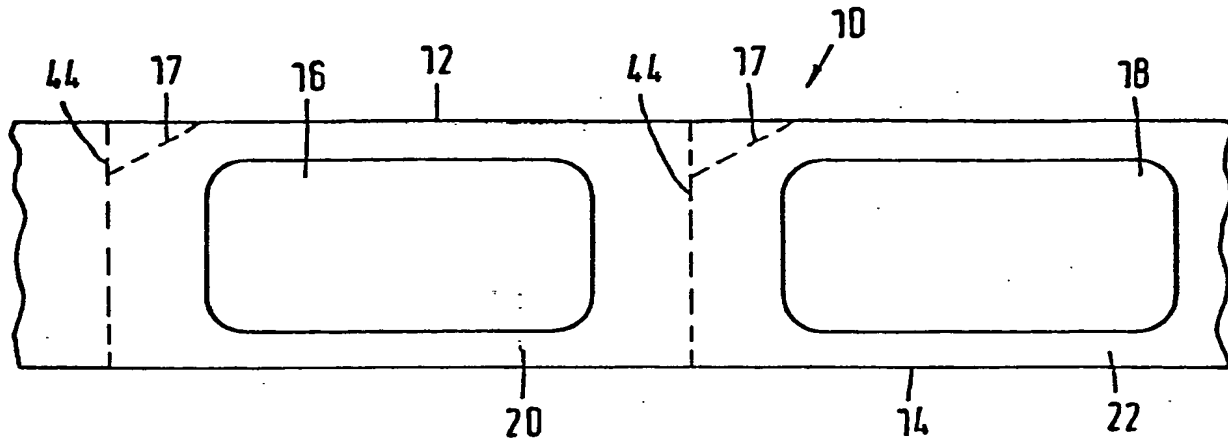


Fig.2

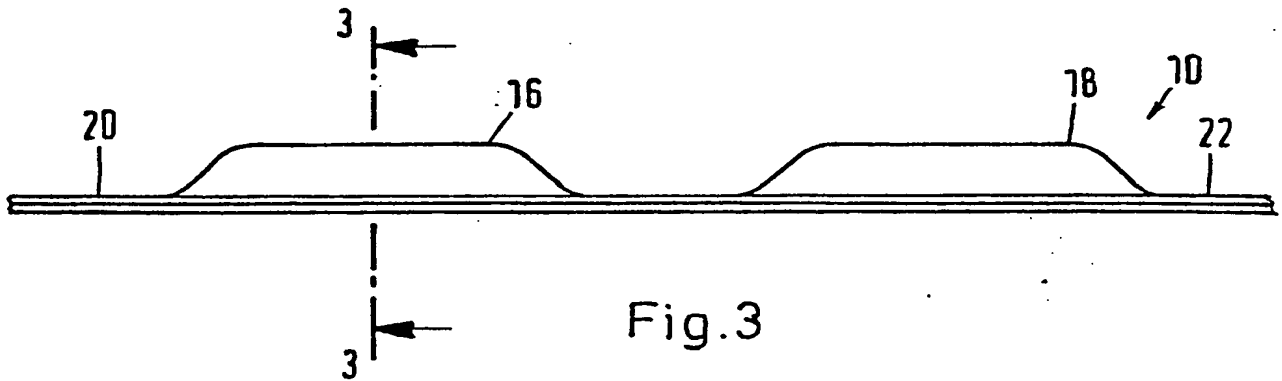


Fig.3

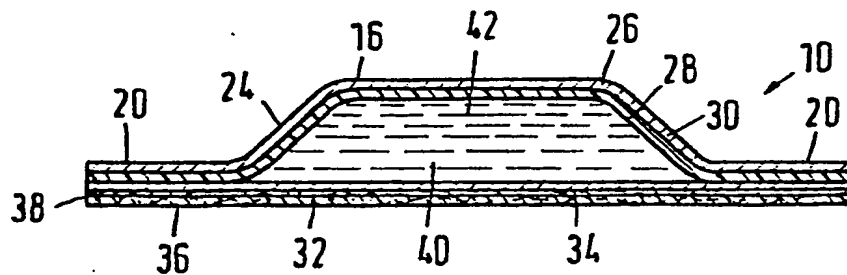
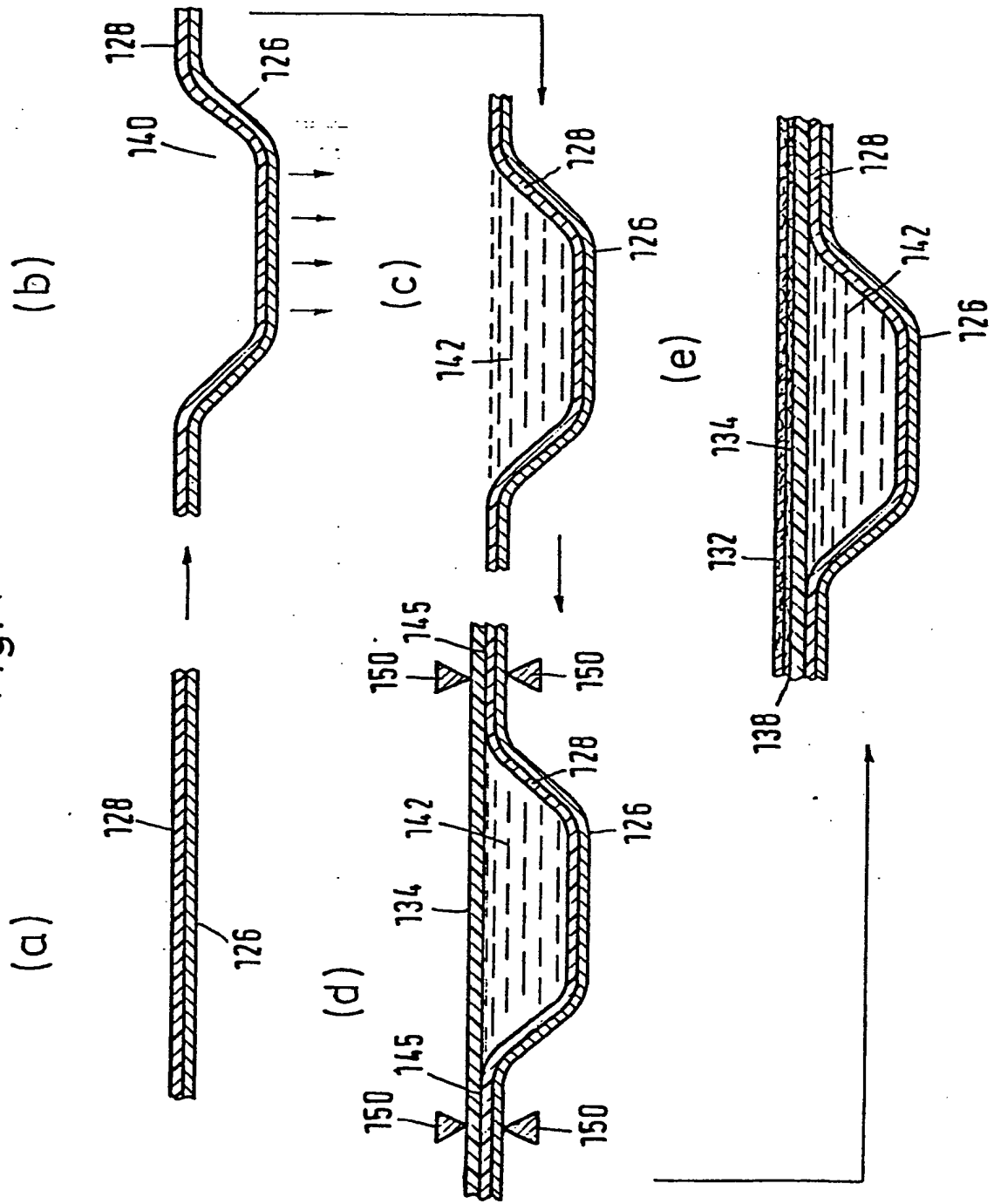


Fig. 4



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Fig. 5

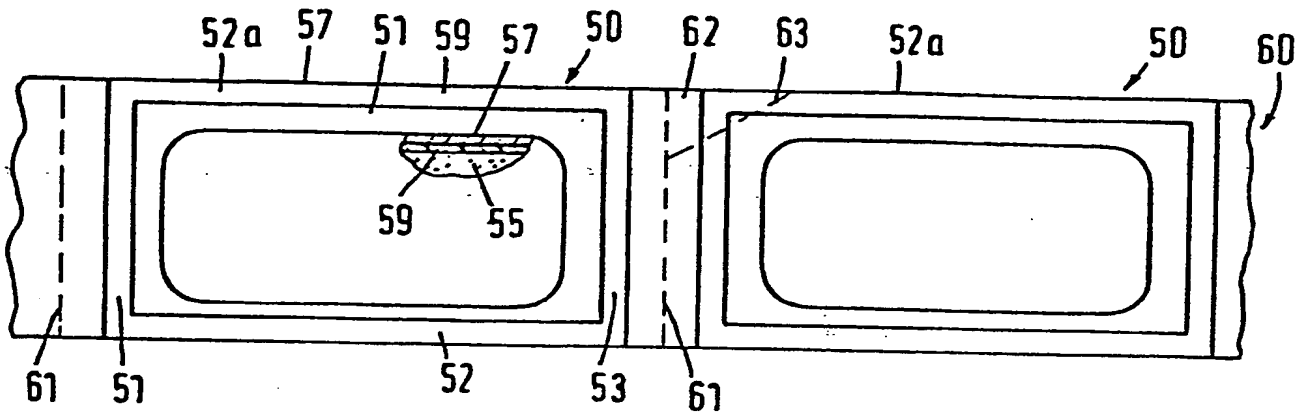


Fig. 6

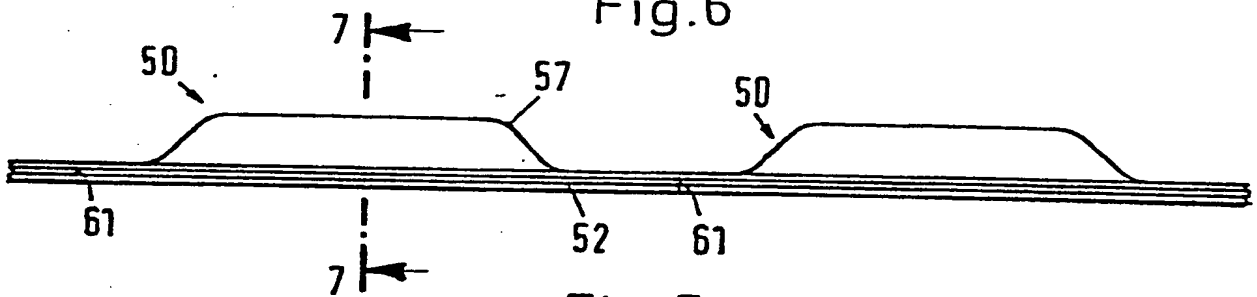


Fig. 7

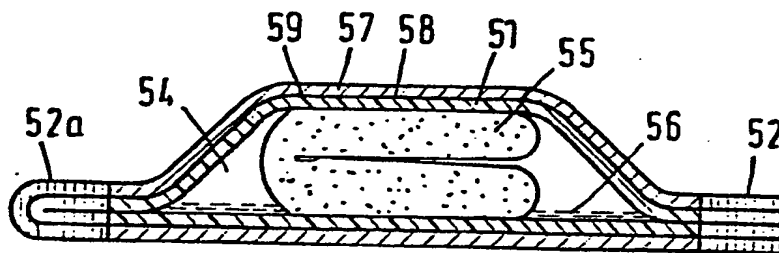
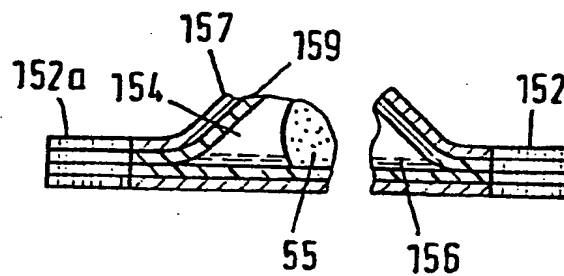
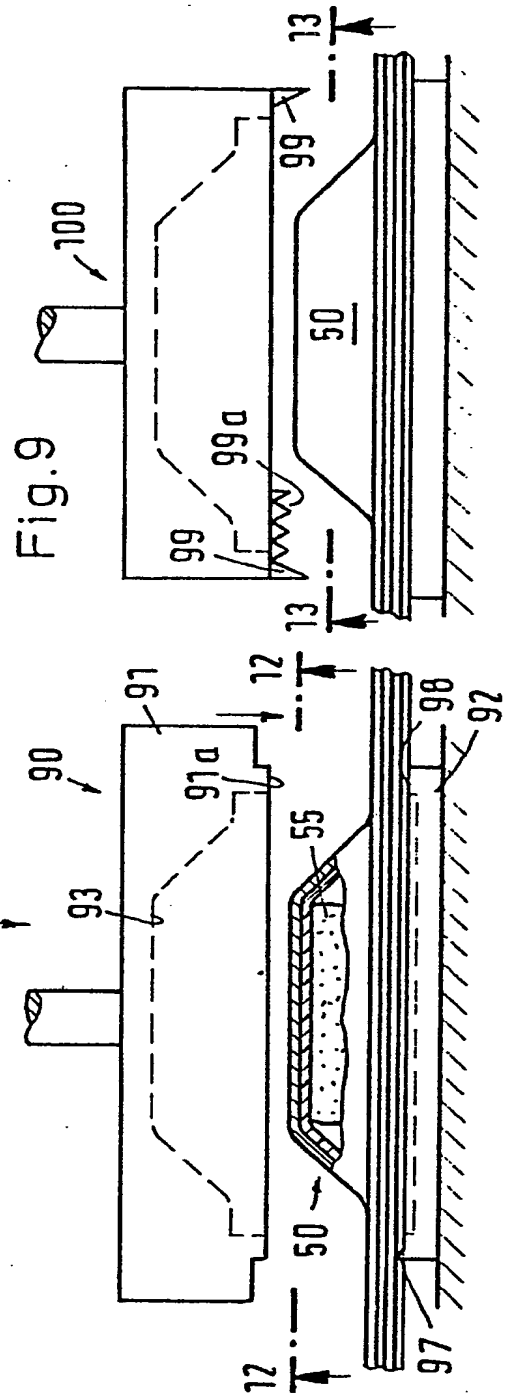
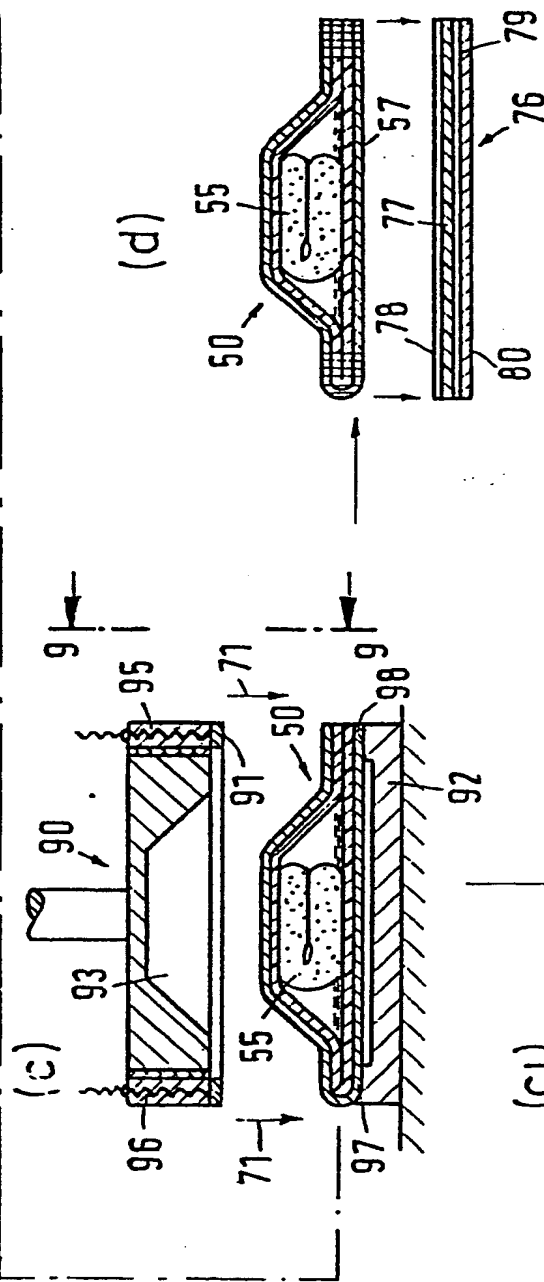
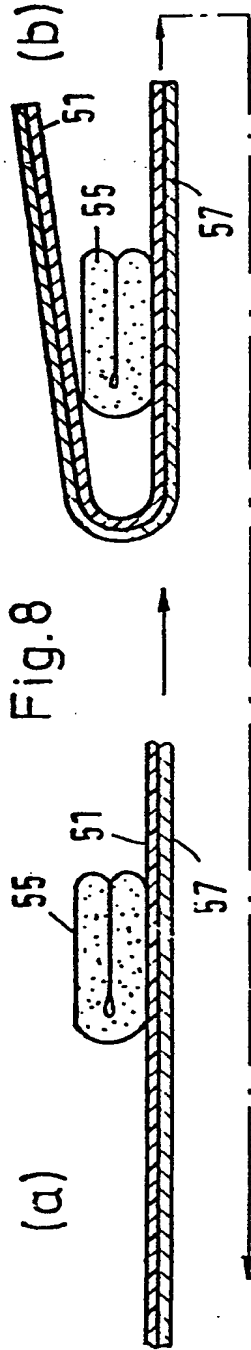


Fig. 7A



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Fig.10

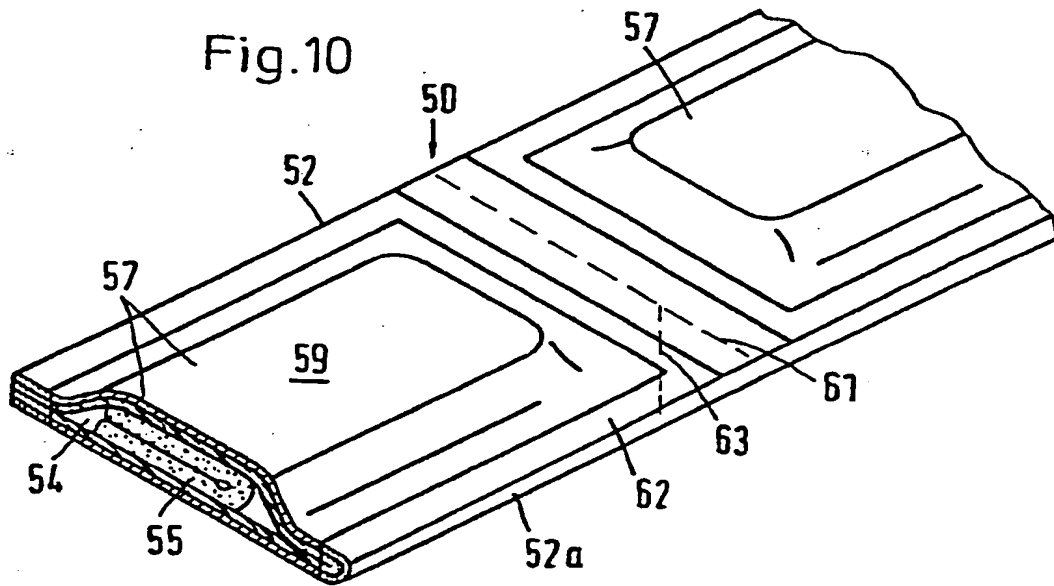


Fig.11

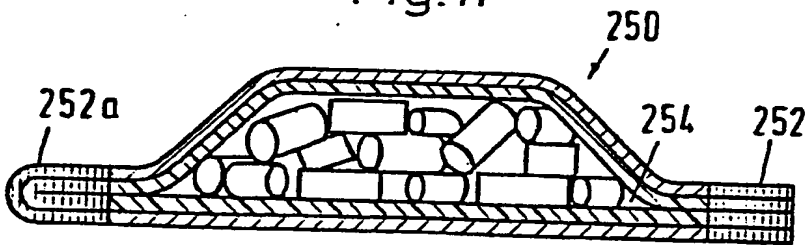
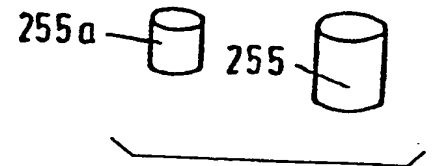


Fig.11A





European Patent  
Office

# EUROPEAN SEARCH REPORT

0093262

Application number

EP 83 10 3019

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	GB-A-1 516 845 (DRG) * Page 1, lines 77-96; figure 1 *	1,3	A 61 L 9/12 A 01 N 25/18 A 01 M 1/20
D,X	--- US-A-4 145 001 (R.J. WEYENBERG) * Column 8, example 8; column 2, lines 1-45 *	1	
X	--- US-A-4 157 787 (B. SWARTZ) * Figure 1; column 2, lines 38-65 *	3	
			-----
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			A 61 L 9/12
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26-07-1983	Examiner PELTRE CHR.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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